

## Long Life Cold Cathodes for Hall effect Thrusters, Phase I

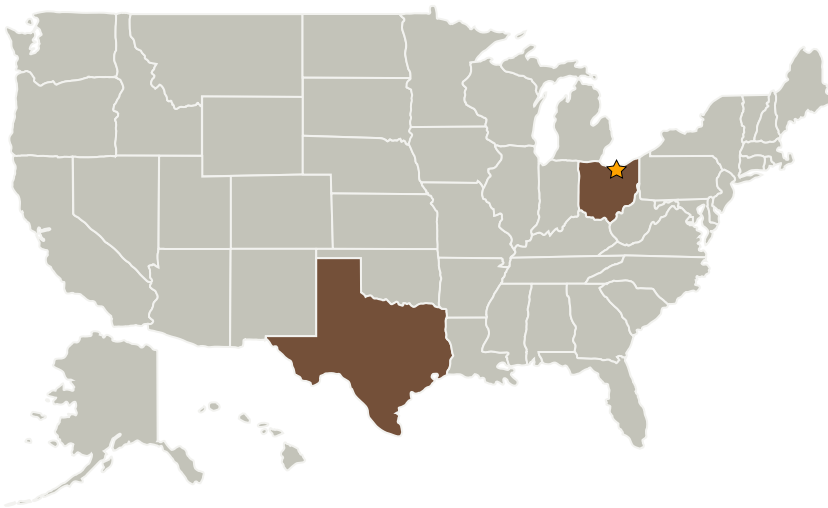
Completed Technology Project (2004 - 2004)



## Project Introduction

An electron source incorporating long life, high current density cold cathodes inside a microchannel plate for use with ion thrusters is proposed. Cathode lifetime in the harsh environment of an ion thruster has been a major issue with cold cathode sources. The anticipated long life with the proposed technology is due to the combination of three design features. The first feature is the choice of an edge emitter geometry known to be much more robust compared to other geometries such as tip emitters or nanotube configurations. The second feature is the choice of carbon as the emitter material. Carbon is well known for resistance to damage from ion bombardment. The third feature is the deposition of the carbon edge emitter inside one end of a channel plate. The channel plate provides some shielding from the thruster ion stream. A further benefit could be realized by using a standard electron multiplying channel plate so as to also greatly increase the electron density of the source.

## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Stellar Microdevices	Supporting Organization	Industry	Austin, Texas



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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Glenn Research Center (GRC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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## Primary U.S. Work Locations

Ohio

Texas

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

Carlos Torrez

### Principal Investigator:

Ronald Hellmer

## Technology Areas

### Primary:

- TX01 Propulsion Systems
  - └ TX01.2 Electric Space Propulsion
    - └ TX01.2.3 Electromagnetic